

### REMARKS

Claims 1-11 are currently pending and stand rejected.

Claims 1-3 are amended herein. The Applicant informs the undersigned that no new matter is presented as a result of these amendments, and that support for these amendments may be found at least at page 2, line 26 – page 3, line 26, page 6, lines 17-26, page 10, line 24 – page 11, line 19, and in original Claims 5 and 6, of the subject application.

Claims 4-7 and 11 are clerically amended herein for clarity. The Applicant respectfully submits that no new matter is presented as a result of these clerical amendments.

Claims 12 and 13 are newly presented herein. The Applicant respectfully submits that no new matter is presented as a result of these new claims. Indeed, support for new Claims 12 and 13 may be found at least at page 8, line 3 – page 9, line 11, of the subject application.

Moreover, the specification is amended herein to include a “Cross-Reference to Related Applications” section with regard to the priority documents of record. No new matter is presented as a result of this amendment.

CLAIM REJECTIONS – 35 U.S.C. § 102(e)

The Office Action states that Claim 1 is rejected under 35 U.S.C. § 102(e) as being anticipated by McGrath et al. (US 6,649,145; hereinafter “McGrath”). The Applicant has reviewed McGrath and respectfully submits that the embodiment as recited in Claim 1 is not anticipated by McGrath for at least the following rationale.

Independent Claim 1, and similarly independent Claims 2 and 3, as amended, recite (emphasis added):

Oxygen nanobubble water comprising an aqueous solution having multiple oxygen nanobubbles therein, each of said oxygen nanobubbles: containing oxygen, having a bubble diameter of 200 nm or less, and being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution.

MPEP § 2131 provides (emphasis added):

“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). ... “The identical invention must be shown in as complete detail as is contained in the ... claim.” Richardson v. Suzuki Motor Co., 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

The Applicant respectfully submits that McGrath fails to disclose each and every element of Claim 1 (and similarly Claims 2 and 3), as amended.

In particular, the Applicant finds McGrath to teach “[c]ompositions and method of tissue superoxygenation”. See title of McGrath. However, the Applicant does not find

the “[c]ompositions and method of tissue superoxygenation” of McGrath to teach, or even suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[.]

as claimed (emphasis added).

Indeed, for purposes of illustration and thoroughness of reasoning, the Applicant has instructed the undersigned to bring the following remarks to the Examiner’s attention.

Upon reviewing McGrath, the Applicant does not find McGrath to disclose a description of how to produce a nanobubble. Rather, the Applicant finds McGrath to disclose a description of a method of raising the amount of oxygen of an organism in vivo.

Although there is a reference to “nanobubbles” in McGrath, it is noted that McGrath states:

Nanobubbles are thought to be flat rather than round and to form closely packed, irregular networks that nearly completely cover hydrophobic surfaces.

*Id.*, column 7, lines 50-52. Thus, “nanobubbles” in McGrath are recognized as a bubble nucleus. On the other hand, in accordance with an embodiment of the present technology, “nanobubbles” are associated with the following structure:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution.

See Claim 1, and similarly Claims 2 and 3 (emphasis added). Upon reviewing McGrath, the Applicant finds McGrath to be completely devoid of any description or suggestion regarding this structure.

For at least the foregoing rationale, the Applicant respectfully submits that the embodiment of independent Claim 1, and similarly the embodiments of independent Claims 2 and 3, are neither anticipated by McGrath under 35 U.S.C. § 102(e) nor obvious in view of McGrath. As such, the Applicant respectfully submits that Claims 1-3 are patentable over McGrath.

In view of the foregoing, the Applicant respectfully requests withdrawal of the instant rejection of Claim 1 made pursuant to 35 U.S.C. § 102(e), as well as allowance of Claim 1.

#### CLAIM REJECTIONS – 35 U.S.C. § 103(a)

The Office Action states that Claims 1-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable in view of McGrath, and in further view of Lee (WO 03/022736), and in further view of Yoshinori (JP 2002-307053), and in further view of JP 60-122337 (name of the inventor is unknown to the Applicant). The Applicant has reviewed the cited art and respectfully submits that the embodiments as recited in Claims 1-11 are patentable over the cited art for at least the following rationale.

#### Independent Claims 1-3

As explained above, the Applicant finds that independent Claims 1-3 are patentable over McGrath at least because the Applicant does not find McGrath to teach or suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[.]

as recited in Claim 1, and similarly in Claims 2 and 3 (emphasis added).

Moreover, the Applicant also finds that the embodiments of Claims 1-3 are also patentable over McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337, at least because the Applicant does not find either Lee, Yoshinori or JP 60-122337 to overcome the aforementioned shortcoming of McGrath.

With respect to Lee, the Applicant finds Lee to teach “[w]ater discharge in a dielectric barrier discharge system to generate an ozonated water”. See title of Lee. With respect to Yoshinori, the Applicant finds Yoshinori to teach “[o]zone water producing apparatus, and gas-liquid separator thereof”. See title of Yoshinori. However, the Applicant does not find either the “[w]ater discharge in a dielectric barrier discharge system to generate an ozonated water” of Lee or the “[o]zone water producing apparatus, and gas-liquid separator thereof” of Yoshinori to teach, or even suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[.]

as claimed (emphasis added).

With respect to JP 60-122337, the Office Action states that “JP 60-122337 disclose the use of a rotation shaft with a screw blade which has thin holes to effect the ozone bubbles ....” See page 3 of the Office Action, *citing* page 3, line 8 – page 4, line 16, as well as the claims, of JP 60-122337. However, assuming *arguendo* that JP 60-122337 does “disclose the use of a rotation shaft with a screw blade which has thin holes to effect the ozone bubbles”, as stated in the Office Action, the Applicant nevertheless does not find JP 60-122337 to teach or suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[.]

as claimed (emphasis added).

Furthermore, and for thoroughness of reasoning, the Applicant has instructed the undersigned to bring the following remarks to the Examiner’s attention.

i. Lee

The Applicant finds Lee to include a description of a method of producing ozone water. This has only described becoming of the ozone water generation efficiency goodness or more when the bubble is made to exist together in solution, though the Applicant finds that the expression of microbubble is also in the description of Lee. In fact, the bubble is used oxygens, and it is not assumed to remain as a bubble. Moreover, the size is admitted only the expression, that is, be smaller than the electrode sense and assumes the bubble at several milli-level in Lee though expresses as the

microbubble. In addition, the generation of the bubble of 100  $\mu\text{m}$  or less is impossible in this method though there is an expression of using the Venturi tube as long as the surfactants etc. are not used.

Moreover, the longevity of the generated ozone water is ten hours at most as the half-life. As the method of lengthening the longevity of the ozone water, the method of making water acidity, and dissolving carbon dioxide is general, and a similar method is adopted in Lee. Usually, the value of the half-life under the condition of pH 3 is ten hours as the longevity of ozone water.

On the other hand, pursuant to an embodiment of the present technology, the microbubble of oxygen is generated under the condition of the electrolyzed water. The bubble grain diameter of the microbubble is 10-50 microns. In many cases, the rising speed of the microbubble is very slow, the microbubble is further made minutely in addition to dissolve an internal gas effectively and has the aspect of disappearing in water (complete dissolution). The reduction speed of the microbubble is compulsorily improved by giving physical irritation. As a result, it is rapidly concentrated ions existing in the gas-liquid interface by the physical irritation, and layers of ions stabilize a nanobubble having the size of 200 nm or less at an extremely long term because the layers suppress the dissolution of an internal gas. The stabilization of nanobubble has one month or more by the condition of preserving it in a usual container.

Thus, the Applicant does not find Lee to teach, or even suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[,]

as claimed (emphasis added).

ii. Yoshinori

The Applicant finds Yoshinori to describe a method of removing the insoluble ozone gas from the ozone water producing.

Usually, the ozone water is generated by making the ozone gas foamed in aqueous solution. However, it is easy to generate ozone as the gas from the ozone water in use when there is the insoluble ozone existing as a bubble. Ozone running away from the ozone water as a gas negatively affects a person's respiratory organ. Therefore, it is a significant act to remove the insoluble from the ozone water. The Applicant finds that Yoshinori includes a description of a method of removing the insoluble ozone gas wherein the centrifuge and the ultrasonic wave are used for the generated ozone water.

In accordance with an embodiment of the present technology, a minute bubble (nanobubble) is stabilized in the electrolyte solution after physical irritation is applied to a micro bubble of ozone, which the Applicant finds to be a very different concept than that which is disclosed in Yoshinori.

Thus, the Applicant does not find Yoshinori to teach, or even suggest:



each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said oxygen from dissolving into the aqueous solution[,]

as claimed (emphasis added).

iii. JP60-122337

The Applicant finds JP60-122337 to be relative to the method of producing the ozone water dissolving the ozone gas generated by the silent electric discharge in water. The problem when the ozone water is made from the ozone gas is to dissolve the gas to water very efficiently. The dissolution efficiency is raised by making the bubble minute by stirring the bubble by the screw and adding the ultrasonic wave in JP60-122337. Though the size of the generated bubble is assumed by several microns or less in JP60-122337, the technology of measuring the bubble of each micron does not currently exist. Moreover, it is assumed that the bubble with a diameter of 1-5 mm stays in water for six seconds in the item of the measurement record. A velocity of rising is about 6 m/min (100 mm/sec) even if it is calculated by the minimum bubble 1 mm, and a depth of water is 1 m to stay at six seconds. It is assumed that it stays in the water tank for 120 seconds in the bubble caused by this technology (described in JP60-122337). The velocity of rising of the bubble becoming an object from this numerical value is about 8 mm/s. The size of the bubble assumed from the velocity of rising of the bubble is larger than that of 100 µm in JP60-122337.

Thus, the Applicant does not find Yoshinori to teach, or even suggest:

each of said oxygen nanobubbles ... being surrounded by an inorganic shell comprised predominantly of electrolytic ions positioned to inhibit said

oxygen from dissolving into the aqueous solution[.]

as claimed (emphasis added).

In view of the foregoing, the Applicant respectfully submits that the structure, effect and purpose of the claimed embodiments are all different than that which is disclosed in the cited art. Moreover, the Applicant respectfully submits that the claimed embodiments do not embody an obvious combination of the teachings of the cited art, and that the claimed embodiments therefore include non-obvious, patentable subject matter.

For at least the foregoing rationale, the Applicant respectfully submits that independent Claim 1, and similarly independent Claims 2 and 3, are patentable over McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337, under 35 U.S.C. § 103(a). As such, the Applicant respectfully requests withdrawal of the instant rejections of Claims 1-3 made pursuant to 35 U.S.C. § 103(a), as well as allowance of Claims 1-3.

#### Dependent Claims 4-11

With respect to Claims 4-11, the Applicant respectfully points out that Claims 4-11 depend from independent Claim 3, and recite further features. Therefore, the Applicant respectfully submits that Claims 4-11 overcome the instant rejections under 35 U.S.C. § 103(a), and that these claims are each in a condition for allowance, as

being dependent on a distinguishable base claim. As such, withdrawal of the rejections of Claims 4-11, as well as allowance of Claims 4-11, is respectfully requested.

### PATENTABILITY OF NEW CLAIMS 12 AND 13

With regard to new Claims 12 and 13, the Applicant finds these claims to be patentable over the cited art for at least the following rationale.

#### Dependency on a Distinguishable Base Claim

The Applicant respectfully points out that new Claims 12 and 13 depend from independent Claim 3, and recite further features. Therefore, the Applicant respectfully submits that Claims 12 and 13 are currently in a condition for allowance as being dependent on a distinguishable base claim. As such, allowance of Claims 12 and 13 is respectfully requested.

#### Further Distinguishing Features

The foregoing notwithstanding, the Applicant also finds new Claims 12 and 13 to be patentable over the cited art for at least the following additional rationale.

##### i. Claim 12

Claim 12 recites (emphasis added):

The method of producing oxygen nanobubble water according to claim 3, wherein said applying the physical irritation to the microbubbles comprises:  
applying the physical irritation to the microbubbles to thereby reduce said microbubble diameter from between 10 and 50  $\mu$ m to 200 nm or less.

The Applicant has reviewed the cited art, and does not find McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337, to teach or suggest:

applying the physical irritation to the microbubbles to thereby reduce said microbubble diameter from between 10 and 50  $\mu\text{m}$  to 200 nm or less[,]

as claimed (emphasis added).

For at least the foregoing additional rationale, the Applicant respectfully submits that new Claim 12 is patentable over McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337. As such, the Applicant respectfully requests allowance of new Claim 12.

ii. Claim 13

Claim 13 recites (emphasis added):

The method of producing oxygen nanobubble water according to claim 3, said method further comprising:

adding electrolytes to the aqueous solution to enable an electric conductivity of the aqueous solution to reach 300  $\mu\text{S}/\text{cm}$  or more to inhibit a reduction in size of the microbubble diameter.

The Applicant has reviewed the cited art, and does not find McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337, to teach or suggest:

adding electrolytes to the aqueous solution to enable an electric conductivity of the aqueous solution to reach 300  $\mu\text{S}/\text{cm}$  or more to inhibit a reduction in size of the microbubble diameter[,]

as claimed.

For at least the foregoing additional rationale, the Applicant respectfully submits that new Claim 13 is patentable over McGrath, alone or in combination with Lee, Yoshinori and/or JP 60-122337. As such, the Applicant respectfully requests allowance of new Claim 13.

## CONCLUSION

In light of the above-listed remarks, reconsideration of the rejected claims is respectfully requested. Based on the arguments presented above, it is respectfully submitted that Claims 1-11 overcome the rejections of record, and are currently in a condition for allowance. Therefore, allowance of Claims 1-11 is respectfully solicited.

Additionally, based on the arguments presented above, it is respectfully submitted that new Claims 12 and 13 are currently in a condition for allowance. Therefore, allowance of Claims 12 and 13 is respectfully solicited.

Should the Examiner have a question regarding the instant response, the Applicant invites the Examiner to contact the Applicant's undersigned representative at the below-listed telephone number.

The foregoing notwithstanding, kindly note that the Commissioner is hereby authorized to charge any additional fees which may be required or credit overpayment to Deposit Account No. 12-0415. In particular, if this response is not timely filed, then the Commissioner is hereby authorized to treat this response as including a petition to extend the time period for response, pursuant to 37 CFR 1.136(a), said petition requesting an extension of time of the number of months available to allow this response to be timely filed, and the petition fee due in connection therewith may be charged to Deposit Account No. 12-0415.

Respectfully submitted,

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